Personal Protective Equipment

Protecting Employees from Workplace Hazards

- Employers must protect employees from workplace hazards such as machines, hazardous substances, and dangerous work procedures that can cause injury
- Employers must:
  - Use all feasible engineering and work practice controls to eliminate and reduce hazards
  - Then use appropriate personal protective equipment (PPE) if these controls do not eliminate the hazards.
- **Remember, PPE is the last level of control!**

Engineering Controls

If . . .

The machine or work environment can be physically changed to prevent employee exposure to the potential hazard,

Then . . .

The hazard can be eliminated with an engineering control.

Engineering Controls (cont'd)

Examples . . .

- Initial design specifications
- Substitute less harmful material
- Change process
- Enclose process
- Isolate process
- Ventilation

Work Practice Controls

If . . .

Employees can be removed from exposure to the potential hazard by changing the way they do their jobs,

Then . . .

The hazard can be eliminated with a work practice control.

Work Practice Controls (cont'd)

Examples . . .

- Use of wet methods to suppress dust
- Personal hygiene
- Housekeeping and maintenance
- Job rotation of workers

Examples of PPE

- Eye - safety glasses, goggles
- Face - face shields
- Head - hard hats
- Feet - safety shoes
- Hands and arms - gloves
- Bodies - vests
- Hearing - earplugs, earmuffs

Establishing a PPE Program

- Sets out procedures for selecting, providing and using PPE as part of an employer's routine operation
- First -- assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use of PPE
- Once the proper PPE has been selected, the employer must provide training to each employee who is required to use PPE

Training

Employees required to use PPE must be trained to know at least the following:

- When PPE is necessary
- What type of PPE is necessary
- How to properly put on, take off, adjust, and wear
- Limitations of the PPE
- Proper care, maintenance, useful life and disposal

Eye Protection

What are some of the causes of eye injuries?

- Dust and other flying particles, such as metal shavings or sawdust
- Molten metal that might splash
- Acids and other caustic liquid chemicals that might splash
- Blood and other potentially infectious body fluids that might splash, spray, or splatter
- Intense light such as that created by welding and lasers

Safety Spectacles

- Made with metal/plastic safety frames
- Most operations require side shields
- Used for moderate impact from particles produced by such jobs as carpentry, woodworking, grinding, and scaling

Goggles

- Protect eyes, eye sockets, and the facial area immediately surrounding the eyes from impact, dust, and splashes
- Some goggles fit over corrective lenses

Welding Shields

Protect eyes from burns caused by infrared or intense radiant light, and protect face and eyes from flying sparks, metal spatter, and slag chips produced during welding, brazing, soldering, and cutting.

Laser Safety Goggles

Protect eyes from intense concentrations of light produced by lasers.

Face Shields

- Protect the face from nuisance dusts and potential splashes or sprays of hazardous liquids
- Do not protect employees from impact hazards

Head Protection

What are some of the causes of head injuries?

- Falling objects
- Bumping head against fixed objects, such as exposed pipes or beams
- Contact with exposed electrical conductors

Classes of Hard Hats

Class A

- General service (e.g., mining, building construction, shipbuilding, lumbering, and manufacturing)
- Good impact protection but limited voltage protection

Class B

- Electrical work
- Protect against falling objects and high-voltage shock and burns

Class C

- Designed for comfort, offer limited protection
- Protects heads that may bump against fixed objects, but do not protect against falling objects or electrical shock

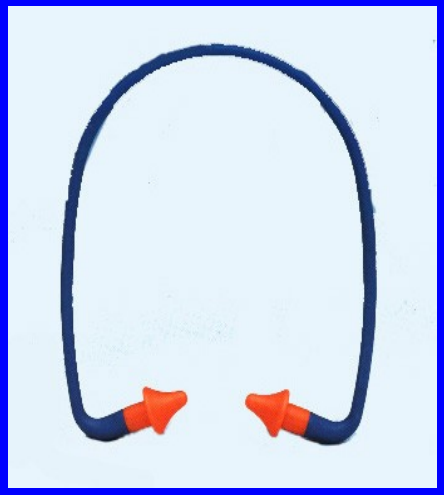
Hearing Protection

Examples of Hearing Protectors

Earmuffs

Earplugs

Canal Caps



Foot Protection

What are some of the causes of foot injuries?

- Heavy objects such as barrels or tools that might roll onto or fall on employees' feet
- Sharp objects such as nails or spikes that might pierce the soles or uppers of ordinary shoes
- Molten metal that might splash on feet
- Hot or wet surfaces
- Slippery surfaces

Safety Shoes

- Have impact-resistant toes and heat-resistant soles that protect against hot surfaces common in roofing, paving, and hot metal industries
- Some have metal insoles to protect against puncture wounds
- May be designed to be electrically conductive for use in explosive atmospheres, or nonconductive to protect from workplace electrical hazards

Metatarsal Guards

A part of the shoes or strapped to the outside of shoes to protect the instep from impact and compression.

Hand Protection

What are some of the hand injuries you need to guard against?

- Burns
- Bruises
- Abrasions
- Cuts
- Punctures
- Fractures
- Amputations
- Chemical Exposures

Types of Gloves

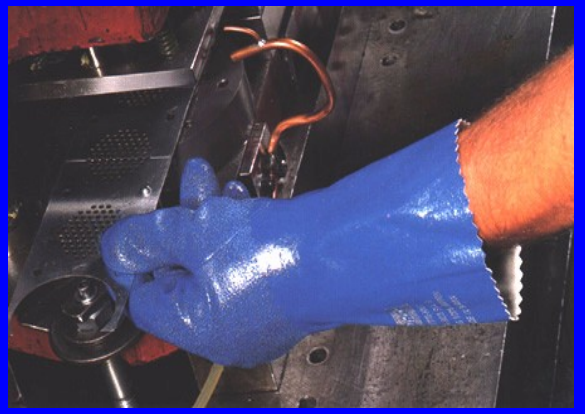
Norfoil laminate resists permeation and breakthrough by an array of toxic/hazardous chemicals.

Butyl provides the highest permeation resistance to gas or water vapors; frequently used for ketones (M.E.K., Acetone) and esters (Amyl Acetate, Ethyl Acetate).

Types of Gloves (cont'd)

Viton is highly resistant to permeation by chlorinated and aromatic solvents.

Nitrile provides protection against a wide variety of solvents, harsh chemicals, fats and petroleum products and also provides excellent resistance to cuts, snags, punctures and abrasions.



Types of Gloves (cont'd)

Kevlar protects against cuts, slashes, and abrasion.

Stainless steel mesh protects against cuts and lacerations.

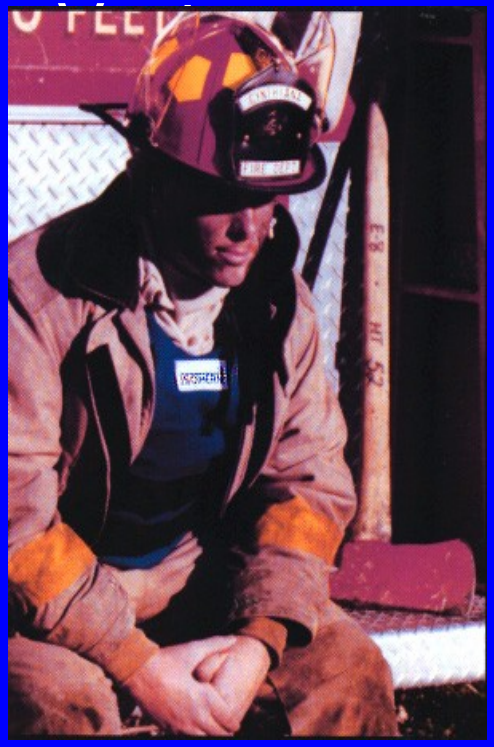
Body Protection

What are some of the causes of body injuries?

- Intense heat
- Splashes of hot metals and other hot liquids
- Impacts from tools, machinery, and materials
- Cuts
- Hazardous chemicals
- Contact with potentially infectious materials, like blood
- Radiation

Body Protection

Cooling



Sleeves and Apron

Body Protection

Coveralls

Full Body Suit

Summary

Employers must implement a PPE program where they:

- Assess the workplace for hazards
- Use engineering and work practice controls to eliminate or reduce hazards before using PPE
- Select appropriate PPE to protect employees from hazards that cannot be eliminated
- Inform employees why the PPE is necessary and when it must be worn
- Train employees how to use and care for their PPE and how to recognize deterioration and failure
- Require employees to wear selected PPE in the workplace